A Glossary of Distributed Systems and Database Terminology

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Glossary

(N, R, W) configurations Quorum based approach to defining consistency: out of N replicas, R must agree for a read and W must agree for a write. To avoid stale reads, $R + W > N$ and to avoid write conflicts $W > \frac{N}{2}$. Systems such as Dynamo relax these constraints to provide eventual consistency. 1

causal consistency objects that are causally related be ordered with respect to a read but still relaxes full linearizability by allowing partial ordering of unrelated objects. 1

Conflict-Free Replicated Data Type In distributed computing, a conflict-free replicated data type (abbreviated CRDT) is a type of specially-designed data structure used to achieve strong eventual consistency (SEC) and monotonicity (absence of rollbacks). As their name indicates, a CRDT instance is distributed into several replicas; each replica can be mutated promptly and concurrently; the potential divergence between replicas is however guaranteed to be eventually reconciled through downstream synchronization (off the critical path); consequently CRDTs are known to be highly available. 1

CRDT Conflict-Free Replicated Data Type. 1

Egalitarian Paxos . 1

eventual consistency if no new updates are made to an object, eventually all accesses will return the last updated value. 1

Fast Paxos . 1

fragmentation . 1

fragmentation transparency The highest level of distribution transparency which specifies that the distributed system does not expose to the user that data is fragmented (sharded) across multiple replicas. As a result, the user can query a global schema without specifying data locations. 1

Generalized Paxos . 1

Hinted Handoff A mechanism used by both Dynamo and Cassandra to reduce the time required for a temporarily failed node to be come consistent again with live nodes and to provide higher availability when consistency is not required. The mechanism is as follows, if a node which should receive a write cannot be contacted, a live replica will write a hint indicating that the write must be replayed at the unavailable node and will try again when it comes back online. 1

isolation level . 1

linearizability . 1

MDCC Multi-Data Center Consistency. 1

Multi-Data Center Consistency An optimistic commit protocol for geo-replicated transactions that does not require a master or static partitioning, and is strongly consistent at a cost similar to eventual consistency protocols. MDCC takes advantage of Generalized Paxos for transaction processing and exploits commutative updates with value constraints in quorum based system. 1, 2

Multi-Paxos . 1

NMSI Non-monotonic Snapshot Isolation. 1

Non-monotonic Snapshot Isolation . 1, 3

Paxos . 1

read committed . 1

read your writes . 1

repeatable reads . 1

sharding . 1

Snapshot Isolation . 1

stale read . 1

two phase commit . 1